The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SWANN S. KALSI and PETER M. WINN

Appeal 2006-3422
Application 10/083,927
Technology Center 2800]

Decided: February 6, 2006

Before JOSEPH F. RUGGIERO, MAHSHID D. SAADAT, and JEAN R. HOMERE, *Administrative Patent Judges*.

HOMERE, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellants appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 1 through 19 and 30 through 36, all of which are pending in this application. Appellants have canceled claims 20 through 29 and 37 through 41 .

We reverse.

Invention

Appellants invented a configuration mechanism (fig. 11) for reducing heat in a stator assembly (512). The stator assembly (512) includes a plurality of coil assemblies (514) and a stator coil support structure (600), which is substantially constructed of a non-magnetic, thermally-conductive material. The stator coil support structure (600) further includes a plurality of channels (604), each being configured to receive at least one of the stator coil assemblies. The channels are radially positioned about an axial passage defined by the stator coil support structure (600) in such a way to receive a rotor assembly (516) as well as to transfer heat from the stator coil assemblies (514).

Claim 1 is representative of the claimed invention and is reproduced as follows:

1. A stator assembly comprising:

a plurality of stator coil assemblies; and

a stator coil support structure, substantially the entire stator coil support structure constructed of a non-magnetic, thermally-conductive material, said stator coil support structure including;

a plurality of channels, each said channel being configured to receive one or more of said stator coil assemblies, said stator coil support defining an axial passage, about which said plurality of channels are radially

positioned, for receiving a rotor assembly and configured to transfer heat from the stator coil assemblies.

References

The Examiner relies on the following references:

Cooper	US 4,123,676	Oct. 31, 1978
Albright	US 4,330,726	May 18, 1982
Boer	US 4,356,419	Oct. 26, 1982
Laskaris	US 4,385,248	May 24, 1983
Denk	US 4,709,180	Nov. 24, 1987
Gamble	US 5,777,420	Jul. 7, 1998
Mariner	US 5,863,467	Jan. 26, 1999

Rejections at Issue

A. Claims 1, 2, 5, 30, and 33 stand rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Boer and Albright.

B. Claims 3, 4, 31, and 32 stand rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Boer, Albright, and Denk.

C. Claims 7, 8, 35, and 36 stand rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Boer, Albright, and Laskaris.

D. Claims 6 and 34 stand rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Boer, Albright, Lascaris and Mariner.

E. Claims 9, 10, 13, and 19 stand rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Boer, Albright, and Cooper.

F. Claims 11 and 12 stand rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Boer, Albright, Cooper, and Denk.

G. Claims 15 and 16 stand rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Boer, Albright, Cooper, and Laskaris.

H. Claim 14 stands rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Boer, Albright, Cooper, Laskaris, and Mariner.

I. Claims 17 and 18 stand rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Boer, Albright, Cooper, and Gamble.

Rather than reiterate the arguments of Appellants and the Examiner, the opinion refers to respective details in the Briefs[1] and the Examiner's Answer.[2] This decision will consider only those arguments that Appellants actually made in the Briefs. We will not consider arguments that Appellants

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[1] Appellants filed an Appeal Brief on April 7, 2006. Appellants filed a Reply Brief on July 25, 2006.

[2] The Examiner mailed an Examiner's Answer on June 8, 2006. The Examiner mailed a communication on August 31, 2006, indicating that the Reply Brief has been entered and considered.

could have made but chose not to make in the Briefs . See 37 C.F.R. 41.37(c)(1) (vii)(eff. Sept. 13, 2004).

OPINION

After considering the entire record before us, we do not agree with the Examiner that claims 1, 2, 5, 30, and 33 are properly rejected under 35 U.S.C. § 103 as being unpatentable over the combination of Boer and Albright. We also do not agree with the Examiner that claims 3, 4, 6 through 19, 31, 32, and 34 through 36 are properly rejected under 35 U.S.C. § 103 as being unpatentable over various combinations of Boer, Albright, Denk, Laskaris, Mariner, Cooper, and Gamble. Accordingly, we reverse the Examiner's rejections of claims 1 through 19 and 30 through 36 for the reasons set forth *infra*.

I. Under 35 U.S.C. § 103, is the Rejection of Claims 1, 2, 5, 30, and 33 as being unpatentable over the Combination of Boer and Albright Proper?

In rejecting claims under 35 U.S.C. § 103, the Examiner bears the initial burden of establishing a prima facie case of obviousness. *In re Oetiker,* 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). *See also In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984). The Examiner can satisfy this burden by showing that some

objective teaching in the prior art or knowledge generally available to one of ordinary skill in the art suggests the claimed subject matter. *In re Fine*, 837 F.2d 1071, 1074, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988). Only if this initial burden is met does the burden of coming forward with evidence or argument shift to the Appellants. *Oetiker*, 977 F.2d at 1445, 24 USPQ2d at 1444. *See also Piasecki,* 745 F.2d at 1472, 223 USPQ at 788. Thus, the Examiner must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the examiner's conclusion. However, a suggestion, teaching, or motivation to combine the relevant prior art teachings does not have to be found explicitly in the prior art, as the teaching, motivation, or suggestion may be implicit from the prior art as a whole, rather than expressly stated in the references. The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art. *In re Kahn*, 441 F.3d 977, 987-88, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006) citing *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1316-17 (Fed. Cir. 2000). *See also In re Thrift*, 298 F.3d 1357, 1363, 63 USPQ2d 2002, 2008 (Fed. Cir. 2002).

An obviousness analysis commences with a review and consideration of all the pertinent evidence and arguments. "In reviewing the [E]xaminer's decision on appeal, the Board must necessarily weigh all of the evidence and argument." *Oetiker*, 977 F.2d at 1445, 24 USPQ2d at 1444. "[T]he Board must not only assure that the requisite findings are made, based on evidence of record, but must also explain the reasoning by which the findings are deemed to support the agency's conclusion." *In re Lee*, 277 F.3d 1338, 1344, 61 USPQ2d 1430, 1434 (Fed. Cir. 2002).

With respect to representative claim 1, Appellants argue in the Briefs that the combination of Boer and Albright does not teach the use of a substantially entire stator coil support structure being constructed of a non-magnetic, thermally conductive material.[3] Particularly, at page 12 of the Appeal Brief, Appellants state the following:

> [C]ombining Boer's non-magnetic tooth-shaped segment parts 202 with Albright's non-magnetic thermally non-conductive material fails to describe "a stator coil support structure, substantially the entire stator coil support structure constructed of a non-magnetic, thermally-conductive material," as required by Appellant's claim 1.

In order for us to decide the question of obviousness, "[t]he first inquiry must be into exactly what the claims define." *In re Wilder*, 429 F.2d

[3] Appellants reiterated these same arguments during a Telephonic Hearing held on January 9, 2007.

447, 450, 166 USPQ 545, 548 (CCPA 1970). "Analysis begins with a key legal question-- what is the invention claimed ?"...Claim interpretation...will normally control the remainder of the decisional process." *Panduit Corp. v. Dennison Mfg. Co.,* 810 F.2d 1561, 1567-68, 1 USPQ2d 1593, 1597 (Fed. Cir. 1987).

We note that representative claim 1 reads in part as follows:

> [A] stator coil support structure, substantially the entire stator coil support structure constructed of a non-magnetic, thermally-conductive material.

We also note that at page 17, lines 20 through 27, Appellants' specification states the following:

> [080] [S]tator coil support structure 600 is constructed of a non-magnetic thermally-conductive material, such as: a polymer-based adhesive (e.g., Advanced Thermal Transfer Adhesive, available from the BTech Corporation, 120 Jones parkway, Brentwood, TN 37027); or a graphite-based material (e.g., Grafoil, available from Union Carbide, 39 Old Ridgebury Road, Danbury, CT 06817). These materials have a favorable thermal transfer coefficient of at least 100 Watt/Meter Kelvin. Specifically, Advanced Thermal Transfer Adhesive has a thermal transfer coefficient of between 100 and 450 Watt/Meter Kelvin and Grafoil has a thermal transfer coefficient of between 140 and 375 Watt/Meter Kelvin. By comparison, glass epoxy material has a thermal transfer coefficient of 0.60 Watt/Meter Kelvin.

Thus, the claim does require that a substantially entire stator coil support structure be constructed of a non-magnetic, thermally conductive

material.

Now, the question before us is what Boer and Albright would have taught to one of ordinary skill in the art? To answer this question, we find the following facts:

1. At column 4, lines 21 through 37, Boer states the following:

> The stator lamination stack 1 and the slot teeth 2 are constructed from common lamination segments. A portion of such a lamination segment 20 is shown in FIG. 2. It comprises a segment part 201 associated with a stator lamination stack 1 (such as is shown in FIG. 1) and tooth-shaped segment parts 202 which form the slot teeth 2 (of FIG. 1) in the lamination stack. The segment portion 201 without teeth is formed of magnetic material such as high-silicon steel, while the tooth-shaped segment parts 202 are formed of non-magnetic material, for instance of an austenetic sheet, such as X10CrNiTi189. The segment part 201 without teeth is joined to the tooth-shaped segment parts 202 by welded seams 203 which run in the region of the base lines of the teeth. The welded seams 203 are disposed somewhat offset from the base line of the teeth since the maximum bending moment occurs in the base line.

2. At column 4, lines 21 through 37, Albright states the following:

> FIG. 1 illustrates two stator modules 10 of the present invention arranged in a stacked configuration forming part of a dynamoelectric machine stator. Each of the stator modules 10 comprises an outer metallic cylindrical portion 12 and an inner nonmetallic cylindrical portion 14. The outer cylinder 12 preferably comprises sectorially shaped laminations of approximately 14 mil-thick silicon steel. The inner cylinder 14 preferably comprises laminations of a material such as glass fibers impregnated with melamine or epoxy resin. The inner

> cylinder 14 possesses inwardly projecting teeth aligned so as to form slots 18 for the stator bar windings (not shown in FIG. 1 for clarity). The laminations comprising the outer metallic cylinder 12 preferably possess slots 22 which are aligned in the stacking process so as to form dovetail slots which mate with keybars located in the frame surrounding the dynamoelectric machine.

3. At column 4, lines 54 through 65 Albright states the following:

> FIG. 2 particularly illustrates the structure for holding the winding bars in the slots 18. These windings comprise an inner conductive core 36, preferably copper, surrounded by an insulating layer 38. Prior to placement within the slot, the slot is fitted with a liner 32 comprising an inert, semiconducting material such as carbon-filled epoxy and glass fibers. Rods 26 are fitted through holes 24 in the metallic outer cylindrical portion 12 and it is to these rods 26 that the stator bar windings are affixed by means of wrapping material 28. This wrapping material preferably comprises glass fiber impregnated with a curable epoxy resin.

With the above discussion in mind, we find that one of ordinary skill in the art at the time of the present invention would have readily found that the combination of Boer and Albright does not amount to a substantially entire stator coil support structure being constructed of a non-magnetic thermally conductive material, as required by representative claim 1.

First, we find that Boer teaches a two-tiered mechanism for fastening an air gap winding for an electric machine. The inner tier comprises a stator lamination stack formed of magnetic material such as high-silicon steel. The outer tier comprises tooth-shaped segment parts formed of non-magnetic,

thermally conductive material, such as austenite, adjoining the inner tier. Next, we find that Albright teaches a two-tiered module for constructing an air gap winding stator for an electro-dynamoelectric machine. The inner tier of the module comprises a non-metallic cylindrical portion possessing inwardly projecting teeth arranged in such a way to form slots for the stator bar windings having an inner conductive core (e.g. copper) surrounded by an insulating layer of lamination material such as glass fibers impregnated with epoxy resin. The outer tier comprises a metallic cylindrical portion with silicon steel lamination slots.

We find the ordinarily skilled artisan would have duly recognized that the combination of Boer and Albright, at best, amounts to a two-tiered stator coil support structure. The first tier includes a tooth-shaped portion formed of non-magnetic and thermally conductive material, as suggested by Boer. The second tier includes a non-metallic tooth shaped inner portion laminated with glass fibers filled with epoxy resin to form slots for windings with conductive core, as suggested by Albright. The ordinarily skilled artisan would have thus recognized that neither the inner tier nor the outer tier disclosed in Albright is constructed of a non-magnetic and thermally conductive material, as the claim requires. Therefore, such teachings cannot be relied upon to cure the deficiencies of Boer. Consequently, the ordinarily

skilled artisan would have aptly recognized that the proposed combination does not amount to a substantially entire stator coil support structure being constructed of a non-magnetic and thermally conductive material.

We therefore conclude, after considering the entire the record before us, that the evidence relied upon and the level of skill in the particular art would not have suggested to the ordinarily skilled artisan the invention as set forth in representative claim 1. Accordingly, we will reverse the Examiner's rejection of claims 1, 2, 5, 30 and 33.

II. Under 35 U.S.C. § 103, is the Rejection of Claims 3, 4, 6 though 19, 31, 32, and 34 through 36 as being unpatentable over Combinations of Boer, Albright, Denk, Laskaris, Mariner, Cooper, and Gamble, Proper?

With respect to claims 3, 4, 6 though 19, 31, 32, and 34 through 36, Appellants argue in the Briefs that Boer and Albright combined do not teach the claimed invention. Particularly, Appellants assert that the Boer-Albright combination does not teach a substantially entire stator coil support structure being constructed of a non-magnetic, thermally conductive material. We have already addressed this argument in the discussion of claim 1 above, and we agree with Appellants. Further, Appellants argue that neither Denk, nor Laskaris, nor Mariner, nor Cooper, nor Gamble cures the deficiencies of Boer-Albright combination. We also agree with Appellants. We therefore

conclude, after considering the entire record before us, that the evidence relied upon and the level of skill in the particular art would not have suggested to the ordinarily skilled artisan the invention as set forth in claims 3, 4, 6 though 19, 31, 32, and 34 through 36. Accordingly, we will reverse the Examiner's rejection of claims 3, 4, 6 though 19, 31, 32, and 34 through 36.

CONCLUSION

In view of the foregoing discussion, we have not sustained the Examiner's decision rejecting claims 1 through 19 and 30 through 36 under 35 U.S.C. § 103. Therefore, we reverse.

REVERSED

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